

APPLICATION FOR
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IN THE NAME OF

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FOR

IN-LINE SECURITY HOOK

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IN-LINE SECURITY HOOK

Field of the Invention

5 The present invention relates to security hooks, and more particularly to a security hook having in-line formed ends to resist unplanned disengagement from a chain or the like.

Background of the Invention

10 "S" hooks have been widely used as security chain end hooks, particularly in the trailer industry. In the trailer industry, chains with S-hooks are used as added security between the trailer and a towing vehicle. In use, these hooks may be engaged in a hole or slot in a vehicle frame, 15 over the flanged edge of a channel-type frame, or with another chain. Oftentimes, the security chain hook is routed through a vehicle tie-down loop or around a frame member with the end hook then engaged over or through a link of the security chain. However, during vehicle operation, 20 vibrations from road conditions or engine operation can cause the S-hook to disengage.

Different designs have been proposed to prevent disengagement of the S-hook during vehicle operation. For example, an S-hook having a protruding end that extends 25 perpendicularly therefrom is known. The protruding end helps prevent the S-hook from coming disengaged. However, such a design is not always effective.

A long felt need exists for a security hook that resists unintentional disengagement and overcomes the other 30 disadvantages of the prior art.

Summary of the Preferred Embodiments

A security hook is disclosed having a main shaft, a chain receiving portion extending from a first end of the main shaft and a first bend extending from a second end of the main shaft. The chain receiving portion and first bend are preferably, but not necessarily, positioned on the same side of the main shaft and are substantially in-line with each other. A second bend extends from the first bend in the opposite direction of the first bend. The security hook, including the main shaft, the chain receiving portion and the first and second bends, is preferably made of an integral metal bar capable of withstanding relatively high forces.

In one embodiment of the invention, the first and second bends each have a straight portion and the second bend extends from the straight portion of the first bend. The straight portions are substantially parallel to the main shaft. The chain receiving portion also includes a straight portion that is substantially parallel to the main shaft.

The second bend of the security hook has a free end that preferably does not extend beyond the first bend. In use, the security hook is engaged with a chain connected to a trailer. The chain is received in the chain receiving portion of the hook. The chain receiving portion is preferably dimensioned to limit the movement of the chain therein and to prevent inadvertent disengagement of the chain from the security hook. When installed, the security hook ensures that the trailer remains connected to the towing vehicle.

Other objects, features and advantages of the present invention will become apparent to those skilled in the art from the following detailed description. It is to be understood, however, that the detailed description and

specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not limitation. Many changes and modifications within the scope of the present invention may be made without departing from the spirit thereof, and the invention includes all such
5 modifications.

Brief Description of the Drawings

The invention may be more readily understood by
10 referring to the accompanying drawings in which

FIG. 1 is a side elevational view of a security hook in accordance with a preferred embodiment of the present invention.

FIG. 2 is a cross-sectional view taken along line 2-2 of
15 the security hook shown in Figure 1.

FIG. 3 is a front elevational view of the security hook of Figure 1.

FIG. 4 is a side elevational view of a preferred embodiment of the security hook of the present invention engaged with a hole in a platform, showing the end portion
20 not extending beyond the first bend.

FIG. 5 is a perspective view of a security hook engaged with a chain in accordance with another preferred embodiment of the present invention.

FIG. 6 is a side elevational view of the security hook
25 of Figure 5.

FIG. 7 is a perspective view of a towing vehicle coupled to a trailer and having the security hook of Figure 1 in combination with a chain as added security therebetween.

FIG. 8 is a right side elevational view of a security
30 hook in accordance with another preferred embodiment of the present invention.

FIG. 9 is a rear elevational view of the security hook of Figure 8.

FIG. 10 is a left side elevational view of the security hook of Figure 8 showing the arm in a closed position.

5 FIG. 11 is a cross-sectional view taken along line 11-11 of the security hook shown in Figure 8.

FIG. 12 is a cross-sectional view taken along line 12-12 of the security hook shown in Figure 8.

10 FIG. 13 is a cross-sectional view taken along line 13-13 of the security hook shown in Figure 8.

FIG. 14 is a left side elevational view of a security hook in accordance with another preferred embodiment of the present invention.

15 FIG. 15 is a front elevational view of the security hook of Figure 14.

FIG. 16 is a right side elevational view of the security hook of Figure 14 showing the arm in an open position.

FIG. 17 is a detailed cross-sectional view of detail 17 of the security hook shown in Figure 16.

20 FIG. 18 is a cross-sectional view taken along line 18-18 of the security hook shown in Figure 16.

FIG. 19 is a cross-sectional view taken along line 19-19 of the security hook shown in Figure 16.

25 FIG. 20 is a cross-sectional view taken along line 20-20 of the security hook shown in Figure 16.

FIG. 21 is a side elevational view of another preferred embodiment of the security hook of the present invention.

FIG. 22 is a front elevational view of the security hook of FIG. 21.

30 FIG. 23 is a partial cross-sectional view taken along line 23-23 of the security hook shown in FIG. 21.

FIG. 24 is a perspective view of the security hook of FIG. 21 engaged with a chain.

FIG. 25 is a perspective view of the security hook of FIG. 21 engaged with a chain.

FIG. 26 is an elevational view of another embodiment of the security hook of the present invention having first and
5 second blocking members.

Like numerals refer to like parts throughout the several views of the drawings.

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Detailed Description of the Preferred Embodiments

A preferred embodiment of the security hook 10 of the present invention, as shown in Figures 1 through 3, includes a chain receiving portion 12, a main shaft 14, a first bend 16 and a second bend 18. The main shaft 14 has first and second opposite ends 14a, 14b. The chain receiving portion 12 is disposed at the first end 14a of the main shaft 14 and is preferably integrally attached to the main shaft 14. In one embodiment of the invention, the chain receiving portion 12 and main shaft 14 are made of an integral piece of metal bar stock and the chain receiving portion 12 is formed by bending the end of the metal bar stock toward the main shaft 14.

Initially, arm 12a of the chain receiving portion 12 extends substantially parallel to the main shaft 14 toward the second bend 18. The term "substantially" is defined as "being largely but not wholly that which is specified." "Substantially parallel" is used herein to indicate components that extend in the same direction in a largely equidistant relationship. However, "substantially parallel" does not require the components to be exactly parallel. Following attachment of security hook 10 to a chain, arm 12a is formed further toward main shaft 14 (shown in phantom in Figure 1) to prevent unintended separation of hook 10 from the chain. In an alternative embodiment, the chain receiving portion 12 is an eye (not shown) welded to the main shaft 14.

As best shown in Figure 1, the first bend 16 extends from the second end 14b of the main shaft 14 and includes a first straight portion 16a. Preferably, the first bend 16 extends upwardly toward the same side of the main shaft 14 as the chain receiving portion 12 such that the first bend 16 is arranged vertically in-line with the chain

receiving portion 12. "In-line" is used herein to indicate that the chain receiving portion 12 and the first bend 16 are positioned on the same side as the main shaft 14, and the first bend 16 is positioned generally in a straight vertical line with respect to the chain receiving portion 12. It is to be understood that the term "vertical" is used herein to refer to the orientation of the components as shown in Figure 3. It will be further understood that the chain receiving member also may reside on the opposite side of the main shaft 14.

In a preferred embodiment of the invention, the second bend 18 bends in the opposite direction as the first bend 16. As shown in Figure 1, the first bend 16 bends upwardly from the main shaft 14 and the second bend 18 bends downwardly from the first straight portion 16a. The second bend 18 extends from the first straight portion 16a and includes second straight portion 18a that terminates in a hook end 22. In one embodiment of the invention, the second bend 18 extends directly from the first bend 16, eliminating the first straight portion 16a. Similarly, the second straight portion 18a can be eliminated causing the second bend to terminate in a hook end 22.

In a preferred embodiment, as shown in Figure 1, the first straight portion 16a is substantially parallel with the main shaft 14, and the second straight portion 18a is substantially parallel with the first straight portion 16a and the main shaft 14. As best shown in Figures 4 and 6, arm 12a is not parallel to the main shaft 14, but is inclined such that the end 26 of arm 12a is approaching the main shaft 14. A gap 24 is defined between the arm 12a and the main shaft 14. Gap 24 is preferably dimensioned to prevent separation of receiving portion 12

from a chain and to restrict the inadvertent disengagement of a chain from first bend 16 of security hook 10.

The security hook 10 can be made of any rigid material, such as metal, plastic, composite, etc. The material used to form the security hook 10 preferably has a yield strength sufficient to withstand loads required of a trailer security chain hook. In a preferred embodiment of the invention, the security hook 10, including the chain receiving portion 12, the main shaft 14, the first bend 16, and the second bend 18, is preferably formed from a single integral metal bar. Alternatively, the elements of the security hook 10 can be separately made and thereafter welded together.

The security hook preferably has a circular cross-section, as best shown in Figure 2. The cross-section, however, is not limited to the embodiment shown but can be of any shape, including, oval, rectangular or any other shape. As best shown in Figure 3, the main shaft 14, first bend 16 (including the first straight portion 16a), and the second bend 18 (including the second straight portion 18a) are co-planar and define a plane P.

In a preferred embodiment of the invention, as best shown in Figure 1, hook end 22 does not extend beyond (or below) the first bend 16. The lower limit of the first bend 16 is illustrated in Figure 1 by line L which extends along the bottom edge of the first bend 16. If hook end 22 extended beyond line L, the use of the security hook 10 in certain applications would be limited. For example, as shown in Figure 7, security hook 10 is used to connect a chain 102 extending from a trailer 116 to a platform 114 of a towing vehicle 118. A preferred method of connecting the chain 102 to the towing vehicle 118 using the security hook 10 is now described in reference to Figures 4 and 7.

To engage the security hook 10 with the platform 114, the hook end 22 of the security hook 10 is inserted into the hole 112. The security hook is pivoted downwardly to allow the second straight portion 18a to enter the hole 112 until the second bend 18 is received in the hole 112. At such point as the first and second straight portions 16a, 18a are substantially parallel with the platform 114, the security hook 10 is pivoted further downwardly such that the first straight portion 16a is received in the hole 112. Once the first bend 16 rests atop the plate 114, the process is completed and the security hook 10 is at rest in the position shown in Figure 4. A person skilled in the art can modify the steps of installing the security hook on the platform without departing from the scope of the present invention.

In a preferred embodiment of the invention, when the security hook 10 is properly installed, hook end 22 rests on the underside 114a of the platform 114 and the main shaft 14 extends in a substantially perpendicular relationship to the platform 114. If the hook end 22 extended beyond line L (shown in Figure 1), the security hook 10 could not be positioned on the platform 114 as depicted in Figure 4. Rather, the security hook would rest in an awkward and inefficient position.

The use of the security hook 10 to connect a chain 102 from a trailer 116 to the platform 114 of a towing vehicle 118 is described for exemplary purposes only. It will be understood that those skilled in the art that there are numerous other uses of the security hook of the present invention.

Referring now to FIGS. 8-13, another preferred embodiment of a security hook 50 in accordance with the present invention is shown. In this embodiment, the main

shaft 14 of the security hook 50 includes a protrusion 52 thereon. The chain receiving portion 12 has a notch 54 defined on an inside surface thereof. The notch 54 is preferably defined where the arm 12a meets the remainder
5 of the chain receiving portion 12, as is shown in FIG. 8.

In a preferred embodiment, the arm 12a defines an open position (as shown in FIG. 8) and a closed position (as shown in FIG. 10). Prior to use, the arm 12a is in the open position. A chain is placed on the chain receiving
10 portion 12 and then the arm 12a is further formed to the closed position. It will be appreciated that the arm 12a will form predictably to the closed position due to the reduced cross-sectional area at the notch 54.

It will also be appreciated that the protrusion 52 is
15 positioned such that when the arm 12a is formed to the closed position that the arm 12a (chain receiving portion 12) and protrusion 52 cooperate to ensure that the chain cannot come out or off of the chain receiving portion 12, i.e., the space between the end of the arm 12a and the
20 protrusion 52 is of a smaller dimension than the cross-sectional width of the chain. Preferably, the end 52a of the protrusion is also wider than the main shaft 14. This can be best seen in FIGS. 9 and 13.

In a preferred embodiment, the protrusion 52 has the
25 cross-sectional shape shown in FIG. 13. However, it will be understood that the protrusion 52 can have any cross-sectional shape that cooperates with the arm to prevent the chain from coming off of the chain receiving member 12.

30 Referring now to FIGS. 14-20, another preferred embodiment of a security hook 70 in accordance with the present invention is shown. In this embodiment, the main

shaft 14 of the security hook 70 includes a protrusion 72 with the cross-sectional shape shown in FIG. 20.

As shown in FIGS. 21-24, another preferred embodiment of the security hook 200 of the present invention includes
5 a chain receiving portion 212, a main shaft 214 and a first bend 216. The main shaft 214 has a first end 218 and a second opposing end 222. The chain receiving portion 212 is preferably integrally attached to the main shaft 214 at the first end 218 and the first bend 216 is
10 preferably integrally attached to the main shaft 214 at the second end 222. In a preferred embodiment of the invention, as shown in FIGS. 21-23, the security hook 200 includes a blocking member 220. Blocking member 220 preferably protrudes from the main shaft 214 toward an
15 arm 224 of the chain receiving portion 212 and is configured to prevent a chain from exiting the chain receiving portion 212 of the security hook 200.

As shown in FIG. 21, the blocking member 220 preferably has an inclined surface 230, and has a tapered
20 shape. When the chain is being installed on the security hook 200, the inclined surface 230 aids in the alignment of the chain with the chain receiving portion 212, thereby facilitating the installation of the chain in the chain receiving portion 212. Once the chain is installed, as
25 shown in FIG. 24, upon angular movement of the chain with respect to the security hook 200, the blocking member 220 restricts the movement of the chain making it impossible for the chain to become disengaged from the security hook 200.

As shown in FIGS. 25 and 26, the blocking member 220 prevents disengagement of the chain from the security hook even if the security hook is installed over a chain link rather than through a chain link. In a preferred

embodiment of the invention, the arm 224 of the security hook 200 has a tapered inner surface 232. The tapered surface 232 gives the security hook 200 a slightly larger opening 234 at the entry end, but pushes the chain link
5 closer to the blocking member 220 once the chain is inserted through the opening 234.

As shown in FIG. 26, in another preferred embodiment of the present invention, security hook 200 includes a second blocking member 240. The second blocking member 240
10 is preferably positioned in an opposite facing relationship with the first blocking member 220. The first and second blocking member 220, 240 cooperate to further restrict the movement of a chain within the chain receiving portion 212, thus ensuring that the chain
15 remains engaged with the chain receiving portion 212.

The embodiments of the present invention recited herein are intended to be merely exemplary and those skilled in the art will be able to make numerous modifications to them without departing from the spirit of
20 the present invention. For example, the first and second straight portions 16a, 18a may be lengthened or omitted; the first and second straight portions 16a, 18a may be non-parallel with each other and/or with the main shaft 14; the end portion 22 may extend beyond the first bend
25 16. All such modifications are intended to be within the scope of the present invention as defined by the claims appended hereto.